CLAIMS:

1. A method for determining the chemosensitivity of cells towards at least one substance by measuring the apoptosis induced by said at least one substance, wherein the apoptosis is determined from the accumulated caspase activity of a sample comprising cells and a medium by adding said at least one substance to the sample followed by incubation, and measuring the accumulated caspase activity in the sample upon disruption of the cells without previously separating off the cells.

2. The method according to claim 1, wherein said cells are animal, including human, cells, especially leukemia cells, cells of solid tumors, cells of pathological organs, and/or reference cells, such as cells from organs other than the pathological ones, or cells from healthy regions of pathological organs.

3. The method according to ~~any of claims 1 to 2~~ claim 1, characterized in that pharmaceutically active substances, chemotherapeutic agents, environmental pollutants, peptides, nucleic acids or derivatives thereof, PNAs and/or nucleic acid hybrides are employed as said substances.

4. The method according to ~~any of claims 1 to 3~~ claim 1, wherein the caspase activity is measured through the substrate turnover rate of fluorogenic or chromogenic substrates, or through the binding of specific markers, such as antibodies, F_{ab} fragments, single-chain antibodies, aptamers (structure-binding nucleic acids), and/or other proteins having binding sites for either unchanged (educts) or converted (products) caspase substrates.

5. The method according to ~~any of claims 1 to 4~~ claim 1, characterized in that said marker comprises a dye portion, a colloidal precious metal, a radioactive isotope, and/or rare-earth metal chelates.

6. The method according to ~~any of claims 1 to 5~~ claim 1, wherein the accumulated caspase activity is measured no sooner than 10 h, especially from 24 to 48 h, after said at least one substance has been added to the sample.

7. The method according to ~~any of claims 1 to 6~~ claim 1, wherein the caspase activity measured is standardized for the total number of the cells.

8. The method according to ~~any of claims 1 to 7~~ claim 1, wherein the measurement of caspase activity is employed for the stratification of tumor diseases, for developing new chemotherapies of tumor diseases, and/or for the optimization of an individual chemotherapy against tumor diseases.

9. A kit containing a sample support with sample compartments, each sample compartment containing at least one substance, and a standardized solution of a reagent for measuring caspase activity.

10. The kit according to claim 9, said substances being present as dry substances, in solution, or in the presence of matrix substances.

11. The kit according to ~~any of claims 9 and/or 10~~ claim 9, wherein said matrix substances are selected from salts, buffers, carbohydrates, carboxylic acids, pyrimidines, inorganic or organic nanoparticles with diameters of up to 1 µm.

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